

REMARKS

The Office Action of August 12, 2004, and the references cited therein have been carefully considered.

In this Amendment, the specification has been amended to correct noted informalities and the claims have been amended solely to overcome the Examiner's formal rejections of same without in any way changing the scope of the claims. Additionally, new independent claim 9 with dependent claims 10 to 17, and the new independent claim 18 with dependent claims 19 and 20 have been added in order to define the invention with a different form and scope. Additionally, a new Abstract has been provided.

Reconsideration of the rejection of claims 1 to 8, i.e., all of the pending claims, under 35 U.S.C. §112, second paragraph, as being indefinite, is respectfully requested. In the ground for rejection, the Examiner has rejected claim 1 since it is unclear whether at least one punched hole or a plurality of punched holes is claimed. In response, claim 1 has been amended to make it clear that while a plurality of punched holes may be present in the table, the die is associated only with one punched hole, and it is submitted that with the amendments this ground for rejection has been overcome. Moreover, claim 2 has been amended so as to avoid the antecedent basis problem by changing the term "the transverse direction" to "a transverse direction".

In regard to claim 8, while the Examiner stated that this claim is unclear, there is no indication of how or why it is unclear or indefinite. That is, claim 8 appears to be clear in that it simply states that the diameter of the shaft, i.e., the part 15, amounts to, i.e., is, a multiple, e.g., twice, of the diameter of the operative portion (23), which includes the guided part (24) and the punching part (26). This relationship is clearly shown in Figures 3 and 4. Thus, Applicants do not believe that any amendment to claim 8 is required. Nevertheless, in order to advance the prosecution of the application, claim 8 has been amended by changing the words "amounts to" to "is" to clarify the meaning thereof.

With the above amendments, it is submitted that the rejection of all the claims under 35 U.S.C. §112, second paragraph, has been overcome and should be withdrawn.

The rejection of claims 1 to 3 and 5 to 8 under 35 U.S.C. §102(d) as being anticipated by the patent to Wilson has been noted and is respectfully traversed. It is submitted that, contrary to the position taken by the Examiner, the patent to Wilson does not show a die as defined in claim 1, as will be discussed below.

The present invention is directed to an improved punching die, which is particularly applicable to the punching of tiny holes in green ceramic sheets. The desired diameter of such holes continues to decrease, requiring that the diameter of the actual punching or stamping portion of the die, which diameter is already relatively small, to be further decreased even while maintaining a constant length for the slender stamping portions. As a result of the decreased diameter, the stiffness of the punching portion or part of the die decreases, so that it is more and more likely to bend during the punching or stamping. The present invention is thus directed to an improved die or punch, whereby the tendency to bend is substantially reduced or eliminated.

The ability to provide punches of smaller diameter without the tendency to bend is achieved according to the invention by providing a die that, as in conventional dies of such type, includes a first larger diameter portion or shaft 15, the movement of which is guided in a guide bushing 18, and an operating portion 23, which has a diameter less than that of the shaft, and which extends through and is guided in the stripper opening of a stripper bushing 21. According to the invention, the operative portion 23 is in effect divided into two parts, i.e., part 25, which still provides the guidance within the stripper bushing, and a punching portion 26, having a diameter that is less than that of the portion 25. As can clearly be seen in Figures 2 to 4, the punching portion 26 extends freely within the stripper opening and is not guided in any way within the opening, i.e., a gap surrounds the portion 26 within the opening 24. A graduated or three-part die as recited in claim 1 is not taught by the Wilson patent. Note that claim 1 requires a three-part die with different diameters for the three parts. That is, it recites that the operative portion, which extends through

the stripper opening, has a diameter that is less than the diameter of the shaft and greater than the diameter of the associated punch hole, and that the punching portion has a diameter that is somewhat less than the diameter of the punched hole. Consequently, with this relationship, the diameter of the punching portion must be less than that of the operative portion, which in turn is less than that of the shaft. No such arrangement with a three-part die is shown in the Wilson patent.

The patent to Wilson discloses a punch which essentially corresponds to that described in the background portion of the present application and which has only two different diameter portions. That is, there is a larger diameter portion corresponding to the claimed shaft provided in the guide sleeve 16, and a smaller diameter portion, corresponding to the punching portion guided in the stripper opening 32 of the stripper plate. However, there is no portion having a diameter smaller than that of the portion extending through the stripper opening. While the Examiner has attempted to distinguish the claimed operating portion from the claimed punching portion in the diagram enclosed with the Office Action, it can clearly be seen that the defined operating portion diameter and the defined punching portion diameter of Wilson are the same. Accordingly, for the above-stated reasons, it is submitted that claim 1 is not anticipated by the Wilson patent under 35 U.S.C. §102 and is allowable over the teachings of this patent.

Claims 2, 3 and 5 to 8 are dependent on claim 1, and therefore allowable under 35 U.S.C. §102 for at least the same reasons as that claim. However, at least certain of these claims contain additional limitations which are not taught by the Wilson patent. For example, claim 2 specifically recites that the punching portion, i.e., the smallest diameter portion 26, is unguided in the transverse direction. Since there is no such smallest diameter portion in the Wilson patent, it can clearly not be unguided in a transverse direction. Contrary to the position taken by the Examiner, the die of Wilson is guided in the transverse direction, i.e., cannot move laterally, in the opening 32 by the walls defining the opening, which may likewise guide it in the longitudinal direction. However, according to the present invention, as recited in claim 2 there is no guidance directly upon the claimed punching portion within the stripper opening.

The inclusion of claims 5 and 6 within this ground of rejection is not clearly understood. It is noted that in rejecting the claims, the Examiner has based the stroke length on the drawing attached to the Office Action. However, there is nothing in the Wilson patent that indicates the stroke length. The Examiner has simply chosen what might be the minimum possible stroke length. Moreover, it is submitted that the claimed stroke length per se is not of great importance, but is only important when related to the remaining features of the die according to the invention. That is, with the present three-diameter graduated die, the stamping portion 26 can now be very short and is shorter than the length of the stripping opening 24. This permits the guiding portion 25 to always remain at least partially within the stripping opening to guide the die itself. This relationship is not of great consequence in the arrangement according to Wilson, where the punching portion is always within and guided by the stripper opening 32.

In regard to claim 7, it is submitted that nowhere in Figures 1 and 5 of Wilson is there any teaching of a through bore (punched hole) that opens into a slug conduit having a diameter greater than the punched hole. Rather, the Wilson patent simply shows a constant diameter through bore.

Claim 8 recites that the diameter of the shaft is a multiple of the diameter of the operative portion, which can clearly be seen in Figures 2 to 4, and particularly in Figures 3 and 4. Clearly, the larger diameter portion of the punch or die of Wilson is not a multiple of the smaller diameter portion in Figures 1 and 5.

Accordingly, for the above stated additional reasons, it is submitted that claims 3 and 5 to 8 are allowable under the Wilson patent under 35 U.S.C. §102.

The rejection of claim 4 under 35 U.S.C. §103 as being unpatentable over the patent to Wilson in view of the patent to Kanawaza et al. likewise has been noted and likewise is respectfully traversed. In this ground of rejection, the patent to Kanawaza et al. was cited to show that providing a stripper with a length that exceeds the length of a punching portion of a die is known, and from this, the Examiner has concluded that it would have been obvious for one skilled in the art to provide a stripper with a length that exceeds the length of the punching portion in the arrangement of Wilson. Initially, it is pointed out that claim 4 depends from claim 1,

and accordingly is allowable over the Wilson patent for at least the same reasons as claim 1 discussed above. The Kanawaza et al. patent does not overcome the deficiency of the Wilson patent so that combining same with the Wilson patent as suggested by the Examiner would still not result in the recited invention of claim 4. Moreover, the die of Kanawaza et al. is not a "punch" for producing holes, but is provided only for the purpose of providing an already formed collar with a flair. Accordingly, the considerations are entirely different with regard to the relative length of the various portions. In any case, regardless of whether or not one would consider combining the teachings in the manner suggested by the Examiner, it is submitted that claim 4 is allowable over the cited combination of references for at least the same reasons discussed above in regard to claim 1.

Finally, reconsideration of the rejection of claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over the Wilson patent is respectfully requested. In this ground for the rejection, and contrary to the position taken above with regard to claims 5 and 6 in the rejection under 35 U.S.C. §102, the Examiner clearly states that Wilson does not teach the relative stroke length of the driving mechanism with respect to the operative portion and the punching portion of the die. The Examiner then concludes that one skilled in the art would have been motivated to adjust the stroke's length relative to the length of the operative and punching portions, so that they can penetrate to a work piece. However, the claimed relationship is not dictated by the ability to penetrate a work piece. Rather, the claimed relationship is provided in order that the larger middle diameter portion (25) always be within the stripper opening (24) to provide positive guidance for the die. Note that, with the present arrangement, if the punching portion is longer than the stripper opening, there will be no guidance of the die, other than via the shaft, during a punching operation, which would be undesirable. It is again pointed out that the claimed relationships only have meaning in terms of the presently claimed invention and there would be no reason to provide the Wilson device with such relationships. Accordingly, for these reasons, in addition to those cited above with regard to claim 1, from which these claims depend, it is submitted that claims 5 and 6 are allowable over the Wilson patent under 35 U.S.C. §103(a).

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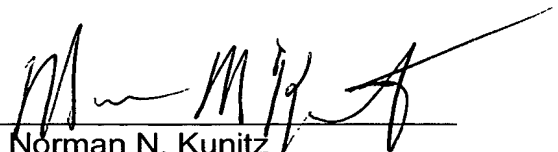
Newly presented independent claims 9 and 18 contain all the limitations of claim 1, but more specifically define various relationships between the parts of the device. Specifically, each of these new independent claims recites the three portions of the die and positively states that there are three separate operative diameters. Accordingly, it is submitted that claims 9 and 18 as well as claims 10 to 17 dependent on claim 9 and claims 19 and 20 dependent on claim 18 are allowable over the Wilson and/or Wilson and Kanawaza et al. references for at least the same reasons discussed above with regard to claims 1 to 6.

In view of the above amendments, and for the above-stated reasons, it is submitted that all of the pending claims, i.e., claims 1 to 20, are allowable over the prior art of record and are in condition for allowance. Such action and the passing of this application to issue therefore are respectfully requested.

If the Examiner is of the opinion that the prosecution of the application would be advanced by a personal interview, the Examiner is invited to telephone undersigned counsel to arrange for such an interview.

Respectfully submitted,

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